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09/805,841	03/14/2001	Toshiki Inoue	TALW-0180	3801

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EXAMINER

NICOLAS, WESLEY A

ART UNIT

PAPER NUMBER

1742

DATE MAILED: 05/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/805,841

Applicant(s)

INOUE ET AL.

Examiner

Wesley A. Nicolas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This is in response to the Amendment dated March 5, 2003. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-11 are currently pending in this application.

#### **Specification**

1. The objections to the specification as set forth in the previous Office action have been **withdrawn** in view of the argument and amendment submitted by Applicant on March 5, 2003.

#### **Claim Objections**

2. The claim objections as set forth in the previous Office action have been **withdrawn** in view of the argument and amendment submitted by Applicant on March 5, 2003.

#### **Claim Rejections - 35 USC § 102**

3. The 35 U.S.C. § 102 rejections as set forth in the previous Office action have been **withdrawn** in view of the argument and amendment submitted by Applicant on March 5, 2003.

**Claim Rejections - 35 USC § 103**

4. The 35 U.S.C. § 103 rejections as set forth in the previous Office action have been **withdrawn** in view of the argument and amendment submitted by Applicant on March 5, 2003.

**Claim Rejections - 35 USC § 103**

5. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dahms et al. (6,099,711), and further in view of Schumacher et al. (5,976,341).

Dahms et al. teach an electrolytic plating method comprising:

- using a wiring board as one pole (Example 4, "circuit board"), and an insoluble electrode as the other pole (col. 6, lines 35-50);
- performing electrolytic plating by applying a forward/reverse current (Fig. 1) with the use of a metal plating solution (col. 8, lines 5-14) which includes iron ions by 0.1 gram/liter or more (col. 8, line 10, "iron(II)sulphate"), so that microvia holes on the wiring board are filled up with metal plating (col. 4, lines 29-30);
- an insoluble electrode which is an electrode (col. 6, lines 35-50) as opposed to a wiring board (Example 4, "circuit board");
- a metal plating solution including iron ions by 0.1 gram/liter or more (col. 8, line 10, "iron(II)sulphate"); and
- a power source for performing electrolytic plating by applying a forward reverse current between the wiring board and said insoluble electrode (Fig. 1, and col. 5, lines 58-63).

Dahms et al. fail to specifically teach stirring the solution to move parallel to the wiring board surface on which a plating layer is generated.

Schumacher et al. teach of an electrolytic deposition method and apparatus which uses iron in a concentration of 0.1 to 50 g/L (col. 6, line 23) and which further flows metal solution parallel to a surface to be plated of the wiring board (col. 8, lines 65-67; col. 10, lines 41-43; and Fig. 3, nozzle below numeral 15).

Claims 1 and 7 are rejected because it would have been obvious and within the ordinary skill in the art at the time the invention was made to have modified the Dahms et al. invention to make the plating solution flow in parallel to the surface to be plated as taught by Schumacher et al. because Schumacher et al. teach that the metal plating solution is stirred to flow in parallel to a surface to be plated of the wiring board (col. 8, lines 65-67; col. 10, lines 41-43; and Fig. 3, nozzle below numeral 15) which would have decreased the ion diffusion boundary layer adjacent to the substrate, allowing for an efficient, uniformly plated layer.

Regarding the plating solution in claim 7, it is being given little patentable weight because it does not define the structure of the apparatus (as it is a liquid which is easily removed). Furthermore, regarding the "power source for performing electrolytic plating...", although Dahms et al. discloses an identical current but not the specific power source, the power source is inherently present in the prior art because in order to have a current as disclosed by Dahms et al., you need a power source. Furthermore, regarding the specific claim language, claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re

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Danly, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). Here, Examiner is not reading said limitation as a means-plus-function limitation and therefore said limitation is merely an intended use which is given little patentable weight. If applicant would like to give the claim structural language, he should change "by applying" to "which is adapted to apply."

Although neither Dahms et al. nor Schumacher et al. teach the specific optimization of plating solution flow rate, claims 2 and 3 are rejected because the plating solution flow would have been considered a result effective variable by one having ordinary skill in the art given that Schumacher teaches that the solution flow should be as high as possible to ensure transfer of ions from the anode to the metal-ion generator (Schumacher et al.: col. 4, lines 30-32). As such, one having ordinary skill would have routinely optimized the solution flow rate to obtain the desired plating properties attendant therewith. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 105 USPQ 233.

Claim 4 is rejected because Dahms et al. teach that the insoluble electrode is configured by a multi-aperture metal mesh (col. 6, lines 66-67).

Claim 5 is rejected because Dahms et al. teach that the metal plating solution is implemented by a copper plating solution (col. 8, lines 5-14); and the wiring board is a printed-circuit board (col. 1, lines 45-49, "circuit board").

Claim 6 is rejected because Dahms et al. teach of arranging a plating bath which accommodates the insoluble electrode and the wiring board (col. 9, lines 58-62), and a copper dissolved bath which supplies copper ions to said plating bath (col. 8, lines 5-14); and circulating the solution with the copper dissolved bath and the plating solution within the plating bath (col. 11, lines 19-24).

Claims 8-9 are rejected because the limitations are merely method limitations which do not define the structure of the apparatus. Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). The intended use and operating method of an apparatus is not germane to the issue of patentability of the apparatus. In re Casey, 370 F.2d 576, 580, 152 USPQ 235, 238 (CCPA 1967). Furthermore, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). See MPEP § 2114.

Claim 11 is rejected because Dahms et al. teach that the insoluble electrode is implemented by a multi-aperture electrode (col. 6, lines 66-67); and the metal plating solution is implemented by a copper plating solution (col. 8, lines 5-14).

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Claim 10 is rejected because Dahms et al. teach of a plating bath accommodating the insoluble electrode and the wiring board (col. 9, lines 58-62), and a copper dissolved bath supplying copper ions to said plating bath (col. 8, lines 5-14); wherein said stirring unit circulates the solution with the copper dissolved bath and the plating solution within the plating bath (col. 11, lines 19-24).

6. Claims 1-3, and 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Senge et al. (6,129,830), and further in view of Schumacher et al. (5,976,341).

Senge et al. fail to specifically teach a stirring unit which makes the metal solution flow parallel to a surface to be plated of the wiring board.

Schumacher et al. teach of an electrolytic deposition method and apparatus which uses iron in a concentration of 0.1 to 50 g/L (col. 6, line 23) and which further flows metal solution parallel to a surface to be plated of the wiring board (col. 8, lines 65-67; col. 10, lines 41-43; and Fig. 3, nozzle below numeral 15).

Claims 1 and 7 are rejected because it would have been obvious and within the ordinary skill in the art at the time the invention was made to have modified the Senge et al. invention to make the plating solution flow in parallel to the surface to be plated as taught by Schumacher et al. because Schumacher et al. teach that the metal plating solution is stirred to flow in parallel to a surface to be plated of the wiring board (col. 8, lines 65-67; col. 10, lines 41-43; and Fig. 3, nozzle below numeral 15) which would have



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decreased the ion diffusion boundary layer adjacent to the substrate, allowing for an efficient, uniformly plated layer.

Regarding the plating solution in claim 7, it is being given little patentable weight because it does not define the structure of the apparatus (as it is a liquid which is easily removed). Furthermore, regarding the specific claim language, claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). Here, Examiner is not reading said limitation as a means-plus-function limitation and therefore said limitation is merely an intended use which is given little patentable weight. If applicant would like to give the claim structural language, he should change "by applying" to "which is adapted to apply."

Although neither Dahms et al. nor Schumacher et al. teach the specific optimization of plating solution flow rate, claims 2 and 3 are rejected because the plating solution flow would have been considered a result effective variable by one having ordinary skill in the art given that Schumacher teaches that the solution flow should be as high as possible to ensure transfer of ions from the anode to the metal-ion generator (Schumacher et al.: col. 4, lines 30-32). As such, one having ordinary skill would have routinely optimized the solution flow rate to obtain the desired plating properties attendant therewith. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 105 USPQ 233.

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Claim 5 is rejected because Senge et al. teach that the metal plating solution is implemented by a copper plating solution (col. 3, lines 55-61); and the wiring board is a printed-circuit board (col. 1, lines 4-6, "printed circuit boards").

Claim 6 is rejected because Senge et al. teach of arranging a plating bath which accommodates the insoluble electrode and the wiring board (Example 1), and a copper dissolved bath which supplies copper ions to said plating bath (Example 1 which relates back to Comparative Example 1); and circulating the solution with the copper dissolved bath and the plating solution within the plating bath (col. 5, lines 12-22, "strong incident flow").

Claims 8-9 are rejected because the limitations are merely method limitations which do not define the structure of the apparatus. Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). The intended use and operating method of an apparatus is not germane to the issue of patentability of the apparatus. In re Casey, 370 F.2d 576, 580, 152 USPQ 235, 238 (CCPA 1967). Furthermore, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). See MPEP § 2114.

Claim 10 is rejected because Senge et al. teach of a plating bath accommodating the insoluble electrode and the wiring board (Example 1), and a copper dissolved bath supplying copper ions to said plating bath (Example 1 which relates back to Comparative Example 1); wherein said stirring unit circulates the solution with the copper dissolved bath and the plating solution within the plating bath (col. 5, lines 12-22, "strong incident flow").

### **Response to Arguments**

7. Applicant's arguments filed March 5, 2003 have been fully considered but they are not persuasive.

Applicant's first argument that Schumacher et al. fail to teach the solution being stirred and moved in a direction parallel to the wiring board surface is unpersuasive. Schumacher et al. clearly teaches of surge nozzles (col. 10, lines 42-44) which teach mixing of the electrolyte solution. Applicant's would surely understand that "mixing" is a functional equivalent of "stirring" as both are just different words to describe the same thing, namely agitation of a medium.

Applicant's second argument that the limitation in newly amended claim 2 was not taught by the prior art of record is also unconvincing. Applicant claims that the flow rate is adjusted to reach "optimum" plating. What exactly is optimum? Surely any skilled artisan would adjust the solution flow in an effort to reach "optimum" conditions. Given the teachings of Schumacher et al. (col. 4, lines 30-32), one of ordinary skill

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would be directed to adjust the solution flow to enhance the metal ion diffusion to the substrate, and to ensure that the plated layer is uniformly formed.

In sum, Applicant's amendment was suggested by the prior art already of record and no new references have been introduced. As set forth below, a new reference of Lepetit et al. (4,292,144) has been cited of record to show that stirring and solution flow are well known within the art.

### **Conclusion**

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. 4,292,144 (Lepetit et al.) - Lepetit et al. teach of a stirrer to facilitate solution flow past a substrate.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley Nicolas whose telephone number is (703)305-0082. The examiner can normally be reached on Mon.-Thurs. from 7am to 5pm.

The Supervisory Primary Examiner for this Art Unit is Nam Nguyen whose telephone number is (703) 308-3322.

The fax number for this Group is (703) 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703)308-0661.

ROY KING   
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700

Wesley Nicolas

May 2, 2003